WHAT IS CLAIMED IS:

1. A scalable imaging system adapted to detect defects on a surface of a substrate using time domain integration sensors, the scalable imaging system comprising:

an imaging platform having a plurality of sensor module ports adapted to receive sensor modules,

a sensor module removably connected to one of the sensor module ports, the sensor module adapted to optically sense swaths on the surface of the substrate, the sensor module including,

a time domain integration sensor adapted to optically sense the swath, the time domain integration sensor having a first width,

optics adapted to focus light from the swath on the time domain integration sensor,

an analog controller disposed adjacent the time domain integration sensor and adapted to receive analog signals from the time domain integration sensor and provide data signals, and

a digital controller adapted to receive the data signals from the analog controller, integrate the data signals into an image of the swath, and provide the image as digital signals to the sensor module port,

a master controller adapted to receive the digital signals from the sensor module ports, composite the digital signals into a single image of a desired portion of the surface of the substrate, and to detect defects within the image of the desired portion of the surface of the substrate, and

a stage adapted to move the substrate under the sensor modules under the control of the master controller, until the desired portion of the surface of the substrate has been imaged.

2. The scalable imaging system of claim 1, wherein the desired portion of the surface of the substrate is all of the surface of the substrate.

3. The scalable imaging system of claim 1, wherein swaths optically sensed by adjacent sensor modules overlap one with another.

4. The scalable imaging system of claim 1, wherein the time domain integration sensors of adjacent sensor modules are not aligned one with another.

5. The scalable imaging system of claim 1, wherein the time domain integration sensors of adjacent sensor modules are aligned one with another.

6. The scalable imaging system of claim 1, wherein the master controller is further adapted to automatically receive the digital signals from an additional sensor module when it is connected to one of the sensor module ports and composite the digital signals from the additional sensor module into the image of the desired portion of the surface of the substrate.

7. The scalable imaging system of claim 1, wherein increasing a number of sensor modules connected to the sensor module ports decreases a number of passes of the stage required to image the desired portion of the surface of the substrate.

8. The scalable imaging system of claim 1, comprising a given number of sensor module ports and the given number of sensor modules connected to the sensor module ports sufficient to image all of the surface of the substrate in a single pass of the stage.

9. The scalable imaging system of claim 1, wherein the sensor module ports are disposed side by side in two lines disposed on either side of a travel axis of the stage.

10. The scalable imaging system of claim 1, wherein the sensor module ports are disposed side by side in two lines disposed on a left side and a right side of a travel axis of the stage, and the sensor module ports on the left side are offset such that when all of the sensor module ports on the left side of the travel axis are filled with sensor modules, all of a left side of the surface of the substrate is imaged in a single pass of the stage, and the sensor module ports on the right side are offset such that when all of the sensor module ports on the right side of the travel axis

are filled with sensor modules, all of a right side of the surface of the substrate is imaged in a single pass of the stage.

11. The scalable imaging system of claim 1, wherein the time domain integration sensor, the optics, and the analog controller of the sensor module are all disposed on a single circuit board and the digital controller of the sensor module is not disposed on the circuit board.

12. The scalable imaging system of claim 1, wherein the time domain integration sensor, the optics, and the analog controller of the sensor module are all disposed on a single circuit board, and the time domain integration sensor is disposed along an edge of the circuit board, and the time domain integration sensors of sensor modules disposed in adjacent sensor module ports are offset one from another by no more than a width of the time domain integration sensors.

13. A scalable imaging system adapted to detect defects on a surface of a substrate using time domain integration sensors, the scalable imaging system comprising:

an imaging platform having a plurality of sensor module ports, the sensor module ports disposed side by side on either side of a travel axis of the substrate through the scalable imaging system,

sensor modules removably connected to the sensor module ports, the sensor modules adapted to optically sense swaths on the surface of the substrate, wherein the swaths optically sensed by the sensor modules overlap one with another, each of the sensor modules including,

a time domain integration sensor adapted to optically sense the swath, the time domain integration sensor having a first width,

optics adapted to focus light from the swath on the time domain integration sensor,

an analog controller disposed adjacent the time domain integration sensor and adapted to receive analog signals from the time domain integration sensor and provide data signals, and

a digital controller adapted to receive the data signals from the analog controller, integrate the data signals into an image of the swath, and provide the image as digital signals to the sensor module port,

a master controller adapted to receive the digital signals from the sensor module ports, composite the digital signals into a single image of a desired portion of the surface of the substrate, and to detect defects within the image of the desired portion of the surface of the substrate, and

a stage adapted to move the substrate under the sensor modules under the control of the master controller, until the desired portion of the surface of the substrate has been imaged.

14. The scalable imaging system of claim 13, comprising a given number of sensor module ports and the given number of sensor modules connected to the sensor module ports sufficient to image all of the surface of the substrate in a single pass of the stage.

15. The scalable imaging system of claim 13, wherein the sensor module ports are disposed on a left side and a right side of a travel axis of the stage, and the sensor module ports on the left side are offset such that when all of the sensor module ports on the left side of the travel axis are filled with sensor modules, all of a left side of the surface of the substrate is imaged in a single pass of the stage, and the sensor module ports on the right side are offset such that when all of the sensor module ports on the right side of the travel axis are filled with sensor modules, all of a right side of the surface of the substrate is imaged in a single pass of the stage.

16. The scalable imaging system of claim 13, wherein the time domain integration sensor, the optics, and the analog controller of a given one of the sensor modules are all disposed on a single circuit board and the digital controller of the one of the sensor modules is not disposed on the circuit board.

17. A scalable imaging system adapted to detect defects on a surface of a substrate using time domain integration sensors, the scalable imaging system comprising:

an imaging platform having a plurality of sensor module ports, the sensor module ports disposed on a left side and a right side of a travel axis of the substrate through the scalable imaging system, and the sensor module ports on the left side are offset such that when all of the sensor module ports on the left side of the travel axis are filled with sensor modules, all of a left side of the surface of the substrate is imaged in a single pass, and the sensor module ports on the right side are offset such that when all of the sensor module ports on the right side of the travel axis are filled with sensor modules, all of a right side of the surface of the substrate is imaged in a single pass,

the sensor modules removably connected to the sensor module ports, the sensor modules adapted to optically sense swaths on the surface of the substrate, wherein the swaths optically sensed by the sensor modules overlap one with another, each of the sensor modules including,

a time domain integration sensor adapted to optically sense the swath, the time domain integration sensor having a first width,

optics adapted to focus light from the swath on the time domain integration sensor,

an analog controller disposed adjacent the time domain integration sensor and adapted to receive analog signals from the time domain integration sensor and provide data signals, and

a digital controller adapted to receive the data signals from the analog controller, integrate the data signals into an image of the swath, and provide the image as digital signals to the sensor module port,

wherein the time domain integration sensor, the optics, and the analog controller are all disposed on a single circuit board and the digital controller is not disposed on the circuit board,

a master controller adapted to receive the digital signals from the sensor module ports, composite the digital signals into a single image of a desired portion of the surface of the substrate, and to detect defects within the image of the desired portion of the surface of the substrate, and

a stage adapted to move the substrate under the sensor modules under the control of the master controller, until the desired portion of the surface of the substrate has been imaged.

18. The scalable imaging system of claim 17, wherein the desired portion of the surface of the substrate is all of the surface of the substrate.

19. The scalable imaging system of claim 17, comprising a given number of sensor module ports and the given number of sensor modules connected to the sensor module ports sufficient to image all of the surface of the substrate in a single pass of the stage.

20. The scalable imaging system of claim 17, wherein the swaths optically sensed by the sensor modules overlap one with another.